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## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

<b>(51) International Patent Classification <sup>6</sup> :</b> <b>C08F 220/04, A61K 7/00</b>	<b>AI</b>	<b>(11) International Publication Number:</b> <b>WO 99/65958</b> <b>(43) International Publication Date:</b> 23 December 1999 (23.12.99)
<b>(21) International Application Number:</b> PCT/US99/13406 <b>(22) International Filing Date:</b> 14 June 1999 (14.06.99) <b>(30) Priority Data:</b> 60/089,216 15 June 1998 (15.06.98) US <b>(71) Applicant (for all designated States except US):</b> UNION CARBIDE CHEMICALS & PLASTICS TECHNOLOGY CORPORATION [US/US]; 39 Old Ridgebury Road, Danbury, CT 06817-0001 (US). <b>(72) Inventors; and</b> <b>(75) Inventors/Applicants (for US only):</b> BASSETT, David, Robinson [US/US]; 100 Fallsworth Drive, Cary, NC 27513 (US). OLESEN, Keith, Russell [CA/US]; 300 Carpenter Town Lane, Morrisville, NC 27560 (US). <b>(74) Agent:</b> WIGGINS, Karen, Johnson; Union Carbide Chemicals & Plastics Technology Corporation, 39 Old Ridgebury Road, Danbury, CT 06817-0001 (US).	<b>(81) Designated States:</b> AL, AU, BA, BB, BG, BR, CA, CN, CU, CZ, EE, GE, HU, ID, IL, IS, JP, KR, KZ, LC, LK, LR, LT, LV, MG, MK, MN, MX, NO, NZ, PL, RO, RU, SG, SI, SK, SL, TR, TT, UA, US, UZ, VN, YU, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).  <b>Published</b> <i>With international search report.</i>	
<b>(54) Title:</b> ALKALI SOLUBLE LATEX THICKENERS  <b>(57) Abstract</b>  Alkali soluble thickeners are disclosed which comprise a reaction product of (A) an unsaturated carboxylic acid monomer, (B) a monoethylenically unsaturated monomer different from monomer (A), and (C) a hydrophobic, alkoxyated macromonomer polymerizable with monomers (A) and (B). The monoethylenically unsaturated monomer different from monomer (A) comprises a methyl group, preferably is an acrylate and more preferably is methyl acrylate. The polymers disclosed solubilize at a pH of from about 4.5 to 6.0, thereby rendering the polymers particularly suitable for use in cosmetic compositions.		

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## INTERNATIONAL SEARCH REPORT

International Application No.

PC1/US 99/13406

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 6 C08F220/04 A61K7/00

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 6 C08F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	US 5 382 641 A (K. KAWATE) 17 January 1995 (1995-01-17) claim 1 ---	1
A	US 4 916 183 A (M. BARRON) 10 April 1990 (1990-04-10) ---	
A	DE 37 35 141 A (CESKOSLOVENSKA AKAD. VED.) 21 April 1988 (1988-04-21) ---	
A	WO 95 00565 A (UNION CARBIDE CHEMICALS & PLASTICS) 5 January 1995 (1995-01-05) cited in the application ---	
A	US 4 514 552 A (G. SHAY) 30 April 1985 (1985-04-30) cited in the application ---	
	--- -/-	

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents:

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&amp;" document member of the same patent family

Date of the actual completion of the international search

24 September 1999

Date of mailing of the international search report

01/10/1999

Name and mailing address of the ISA

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Authorized officer

Cauwenberg, C

# INTERNATIONAL SEARCH REPORT

International Application No

PCI/US 99/13406

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>EP 0 350 414 A (SOC. COATEX)  10 January 1990 (1990-01-10)</p>	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

Inter-Application No

PC1/US 99/13406

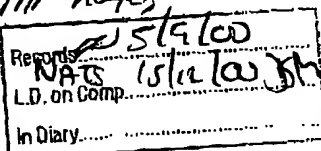
Patent document cited in search report	Publication date	Patent family member(s)	Publication date
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		US 5015711 A	14-05-1991
		US 5066710 A	19-11-1991

## PATENT COOPERATION TREATY

From the  
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

HAYES, Adrian Chetwynd et al.  
BOULT WADE TENNANT  
27 Fumival Street  
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PCT

NOTIFICATION OF TRANSMITTAL OF  
THE INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT

(PCT Rule 71.1)

Date of mailing  
(day/month/year)

01. 09 00

Applicant's or agent's file reference

ACH/54397/00

IMPORTANT NOTIFICATION

International application No.

PCT/US99/13406

International filing date (day/month/year)

14/06/1999

Priority date (day/month/year)

15/06/1998

Applicant

UNION CARBIDE CHEMICALS & PLASTICS ... et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.
2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.
3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. REMINDER

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

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## PATENT COOPERATION TREATY

## PCT

## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ACH/54397/00		FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
International application No. PCT/US99/13406	International filing date (day/month/year) 14/06/1999	Priority date (day/month/year) 15/06/1998	
International Patent Classification (IPC) or national classification and IPC C08F220/04			
Applicant UNION CARBIDE CHEMICALS & PLASTICS ... et al.			
<p>1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.</p> <p>2. This REPORT consists of a total of 5 sheets, including this cover sheet.</p> <p><input type="checkbox"/> This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).</p> <p>These annexes consist of a total of 1 sheets.</p>			
<p>3. This report contains indications relating to the following items:</p> <ul style="list-style-type: none"><li>I <input checked="" type="checkbox"/> Basis of the report</li><li>II <input type="checkbox"/> Priority</li><li>III <input type="checkbox"/> Non-establishment of opinion with regard to novelty, inventive step and industrial applicability</li><li>IV <input type="checkbox"/> Lack of unity of invention</li><li>V <input checked="" type="checkbox"/> Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement</li><li>VI <input type="checkbox"/> Certain documents cited</li><li>VII <input checked="" type="checkbox"/> Certain defects in the international application</li><li>VIII <input checked="" type="checkbox"/> Certain observations on the international application</li></ul>			
Date of submission of the demand 11/01/2000		Date of completion of this report 01. 09. 00	
Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Rouault, Y Telephone No. +49 89 2399 8524 	

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/US99/13406

**I. Basis of the report**

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

**Description, pages:**

1-23 as originally filed

**Claims, No.:**

2-18 as originally filed

1 with telefax of 06/07/2000

**2. The amendments have resulted in the cancellation of:**

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

**4. Additional observations, if necessary:****V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****1. Statement**

Novelty (N)	Yes:	Claims 1-18
	No:	Claims
Inventive step (IS)	Yes:	Claims 1-18
	No:	Claims
Industrial applicability (IA)	Yes:	Claims 1-18
	No:	Claims



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/US99/13406

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**2. Citations and explanations**

**see separate sheet**

**VII. Certain defects in the international application**

The following defects in the form or contents of the international application have been noted:

**see separate sheet**

**VIII. Certain observations on the international application**

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US99/13406

**Re Item V****Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement****Novelty**

The present set of claims is novel (Art. 33(2) PCT).

None of these documents describe a process as defined in the independent claim 1, i.e. a polymer comprising the reaction product of:

(A) an unsaturated carboxylic acid monomer;

(B) a monoethylenically unsaturated monomer different from monomer (A);

and

(C) a macromonomer comprising a hydrophobic portion and an alkoxyated portion which is polymerizable with monomer (A) and monomer (B) characterized in that

(i) the monoethylenically unsaturated monomer (B) comprises a methyl group; and

(ii) an aqueous solution of the polymer at a concentration of 1 wt% has a viscosity of at least 10,000 cP at a pH of less than 6.0.

**Inventive step**

The present set of claims is based on an inventive step (Art 33(3) PCT).

The replacement of ethyl acrylate with methyl acrylate in the polymer of the present invention results in a substantial reduction in the pH necessary to achieve viscosification of the aqueous composition. This surprising effect is not expected nor suggested in any documents cited in the search report. The use of the monoethylenically unsaturated monomer (B) comprising a methyl group solves therefore the underlying problem, namely how to obtain a polymer with a substantial reduction in the pH necessary to achieve viscosification of the aqueous composition in comparison with polymers disclosed in the prior art.

The cited documents, even if combined, could not lead to the present invention.

**The industrial applicability (Art 33(4) PCT) is obvious.**

**R Item VII****Certain defects in the international applicati n**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/US99/13406

The viscosity should be given in Pa.s.

The term "behenyl" seems to be incorrect and "behenic" or "behenolyl" should be used instead (see Hackh's chemical dictionary, McGraw-Hill book company (1981) p.83).

**Re Item VIII****Certain observations on the international application**

1. Claim 1 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The wording of claim 1 (ii) is understood as a characterization of the polymer through a parameter, the viscosity, measured in a non standard way. All the conditions for the measure of the viscosity parameter (like, e.g. temperature) should be clearly given in the claim, as they are p.11 l. 22-26 of the application.
2. The relative term "about" used in claims 1,5,7,9,14,15,18 has no well-recognised meaning and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claims unclear (Article 6 PCT).

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CLAIMS

1. A polymer comprising the reaction product of:  
    (A) an unsaturated carboxylic acid monomer;  
5      (B) a monoethylenically unsaturated monomer  
different from monomer (A); and  
    (C) a macromonomer comprising a hydrophobic  
portion and an alkoxyated portion which is  
polymerizable with monomer (A) and monomer (B);  
10 characterized in that:  
    (i) the monoethylenically unsaturated  
monomer (B) comprises a methyl group; and  
    (ii) an aqueous solution of the polymer at a  
concentration of 1.0 weight percent has a viscosity of  
15 at least 10,000 cP at a pH of less than about 6.0.
- ~~2. The polymer of claim 1 wherein the hydrophobic  
macromonomer is a urethane monomer comprising the  
reaction product of a monohydric surfactant and a  
20 monoethylenically unsaturated isocyanate.~~
3. The polymer of claim 1 wherein monomer (B) is an  
acrylate.
- 25 ~~4. The polymer of claim 3 wherein monomer (B) is  
methyl acrylate.~~

AMENDED SHEET

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## PATENT COOPERATION TREATY

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## INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference ACH/54397/00		<b>FOR FURTHER ACTION</b> See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)	
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Name and mailing address of the international preliminary examining authority:  European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465		Authorized officer Rouault, Y Telephone No. +49 89 2399 8524 	

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/US99/13406

**I. Basis of the report**

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2-18 as originally filed

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☐ the claims, Nos.:  
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

**V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**1. Statement**

Novelty (N)	Yes:	Claims 1-18
	No:	Claims
Inventive step (IS)	Yes:	Claims 1-18
	No:	Claims
Industrial applicability (IA)	Yes:	Claims 1-18
	No:	Claims



**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT**

International application No. PCT/US99/13406

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**2. Citations and explanations**

**see separate sheet**

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**see separate sheet**

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**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/US99/13406

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

**Novelty**

The present set of claims is novel (Art. 33(2) PCT).

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The cited documents, even if combined, could not lead to the present invention.

**The industrial applicability (Art 33(4) PCT) is obvious.**

**Re Item VII**

**Certain defects in the international application**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

---

International application No. PCT/US99/13406

The viscosity should be given in Pa.s.

The term "behenyl" seems to be incorrect and "behenic" or "behenolyl" should be used instead (see Hackh's chemical dictionary, McGraw-Hill book company (1981) p.83).

**Re Item VIII**

**Certain observations on the international application**

1. Claim 1 does not meet the requirements of Article 6 PCT in that the matter for which protection is sought is not clearly defined. The wording of claim 1 (ii) is understood as a characterization of the polymer through a parameter, the viscosity, measured in a non standard way. All the conditions for the measure of the viscosity parameter (like, e.g. temperature) should be clearly given in the claim, as they are p.11 l. 22-26 of the application.
2. The relative term "about" used in claims 1,5,7,9,14,15,18 has no well-recognised meaning and leaves the reader in doubt as to the meaning of the technical features to which it refers, thereby rendering the definition of the subject-matter of said claims unclear (Article 6 PCT).

## ALKALI SOLUBLE LATEX THICKENERS

Patent Number: WO9965958  
Publication date: 1999-12-23  
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Requested Patent: ☐ WO9965958  
Application Number: WO1999US13406 19990614  
Priority Number(s): US19980089216P 19980615  
IPC Classification: C08F220/04; A61K7/00  
EC Classification: C08F290/06, C08F290/06A, C08F220/04, A61K7/48N12, C08F290/06B  
Equivalents: AU4682899, BR9911170, CA2335242, ☐ EP1093478 (WO9965958), JP2002518530T  
Cited Documents: US5382641; US4916183; DE3735141; WO9500565; US4514552; EP0350414

### Abstract

Alkali soluble thickeners are disclosed which comprise a reaction product of (A) an unsaturated carboxylic acid monomer, (B) a monoethylenically unsaturated monomer different from monomer (A), and (C) a hydrophobic, alkoxylated macromonomer polymerizable with monomers (A) and (B). The monoethylenically unsaturated monomer different from monomer (A) comprises a methyl group, preferably is an acrylate and more preferably is methyl acrylate. The polymers disclosed solubilize at a pH of from about 4.5 to 6.0, thereby rendering the polymers particularly suitable for use in cosmetic compositions.

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CLAIMS

(63)

1. A polymer comprising the reaction product of:
- 5 (A) an unsaturated carboxylic acid monomer;
- (B) a monoethylenically unsaturated monomer  
different from monomer (A); and
- (C) a macromonomer comprising a hydrophobic  
portion and an alkoxyated portion which is  
polymerizable with monomer (A) and monomer (B):
- 10 characterized in that:
- (i) the monoethylenically unsaturated  
monomer (B) comprises a methyl group; and
- (ii) an aqueous solution of the polymer at a  
concentration of 1.0 weight percent has a viscosity of
- 15 at least 10,000 cP at a pH of less than about 6.0.
- ~~2. The polymer of claim 1 wherein the hydrophobic  
macromonomer is a urethane monomer comprising the  
reaction product of a monohydric surfactant and a  
20 monoethylenically unsaturated isocyanate.~~
3. The polymer of claim 1 wherein monomer (B) is an  
acrylate.
- 25 ~~4. The polymer of claim 3 wherein monomer (B) is  
methyl acrylate.~~

AMENDED SHEET